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UNIMAS RESEARCH UPDATE

UNIMAS NEW HOPES IN THE NEW MILLENNIUM

Six years ago, UNIMAS was an unknown commodity. As we intoned our mantra of the vision and mission to emerge as a new wave university, we were scoffed at and passed on as being an empty vessel. Justifiably such derisive treatment is expected as we struggled and stumbled from zero base. But today we can all hold our heads high as we look back at how much we have grown into an institution of higher learning of reputable stature; purged from obscurity. It is remarkable, almost incredible, that UNIMAS now has reached a height that puts it among one of the more prominent centres of excellence in both teaching-learning and research at the national and international levels. The key to this rapid achievement has been our strategic and pragmatic outlook. We set grimly modest goals that will not prove too lofty for us to achieve. We started off with a small student enrolment in only two fledgling Faculties in 1994 and found ourselves on a steep learning curve of building a university with a difference. Basically our underlying mantra then was 'to do less, but to do it well'.

From the word go, we were in the grip of a global information revolution - a period of change that can be strategically exploited to UNIMAS' advantage. Although located away from the nation's capital, UNIMAS never suffered from aloneness or felt isolated from its stakeholders; the students, industries and the intellectual community at large. The IT and the Internet have broken down barriers of national borders, time and distance in ways that created a myriad of opportunities for a university to function and serve effectively. Our timely decision to optimise the use of IT in everything we do has paid off beyond anyone's imagination. The IT culture at UNIMAS blossomed almost overnight. The transition we went through to utilise the Internet as a vehicle for communication has been utterly painless. IT has served as a change-agent in the way we do things at UNIMAS; in course delivery, information exchange, research and day-to-day administrations at all levels.

In the area of teaching and learning, we chose to offer courses and skills training in areas that are deemed market-driven, preparing graduates for the real world of work. True to plan, the last three batches of UNIMAS graduates have encountered little, if at all, difficulties in being absorbed by the Malaysian job-markets, even in the face of the recent economic downturn. In assuming its role in the advancement, dissemination and application of new knowledge, UNIMAS has made significant contributions in many areas of research. In molecular medicine, we have carved our own niche and prominence in the area of emerging diseases, particularly the ever-increasing threats posed by viral diseases and cancer. Our research on both marine and terrestrial biodiversity and environment continue to get funding from private sectors and international agencies. Significant progress has been made in the applications of information and communication technologies especially in providing on-line courses and skills training through our virtual campus project.

As a new kid on the block, UNIMAS has indeed proven itself as a university with an attitude. We frequently make no bones about the fact that our source of success has been our stoic aspiration to frog-leap and attain excellence on a par with the others. We were aware that the goals we set six years ago are to be striven toward and would be hard-pressed for instant realisation. Admittedly fulfilling all our promises and achieving those seemingly lofty goals remain elusive. This, despite our unremitting enthusiasm and strong commitment. We have however proven to ourselves that we are not pathologically unable to meet those targets. The last six years has indeed been a time of honest toil before a glorious harvest.

Setting our course for the new millennium, UNIMAS must strive to bridge the gap between vision and reality. In our past and current activities, innovations have been built into almost every aspect of our procedures. It became

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obvious that innovation has been the key to UNIMAS remarkable performance and growth in its core businesses of teaching-learning, research and governance. But to leap into the unknown, to meet the challenges and opportunities of the new millennium, we would require, more than just innovation, creativity. Obviously the two are linked but fostering creativity is even tougher than fostering innovation. Creativity is an attribute of the individual mind. It is the ability to generate original ideas that will benefit our university as a whole. The question to ask ourselves now is whether we have been as creative as we could be? What can we do collectively to enhance individual creativity at UNIMAS? Maybe the most creative thing we can do is to ensure that whatever bureaucratic and organisational impediments to fostering creativity at UNIMAS come tumbling down in this new millennium.

The new millennium requires that we remain punchily ambitious rather than complacent. Our persistence and indomitable high-spirit will again prove a palliative viagra that we all need for UNIMAS' future to succeed. No doubt, many of what we set out to do remain undone. But let us not lose the sense of hope that we once harbored so passionately. Work out in us that unquenchable thirst for knowledge and instill in us the passion for excellence. We have succeeded in ridding ourselves from the sense of unrelieved hopelessness that so pervaded UNIMAS during its early days. We have proven the doubters wrong. Let's get on with it. The new millennial dawn has cast a golden glow over the far horizon. UNIMAS future looks busy and bright. We are not there yet but we do have a golden chance.

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UNIMAS GETS RESEARCH CONTRACT ON ENVIRONMENT SENSITIVITY INDEX FROM SARAWAK SHELL

Sarawak Shell and Petronas Carigali, have appointed the Institute of Biodiversity and Environmental Conservation (IBEC) UNIMAS to prepare a GIS-based Environmental Sensitivity Index for the west coasts of Sabah and Sarawak. This survey of biodiversity and geological morphology includes a detailed description of beach and marine ecological habitats. A helicopter survey of the coast using three separate video cameras has enabled us to include digital images of key locations with the GIS coastal map. This remote sensing survey information has been supplemented by site visits to over 350 locations along the coast. The Roxann and Differential Global Positioning System (DGPS) equipment enables remote sensing recordings of depth and bottom composition to be made in real time and stored directly on a map in the computer. Each kilometer of the coast is classified by both its geographical and biological features which include data on exposure to wave action, sediment type, accessibility, human population and settlements, land-use patterns and other relevant variables. All natural and man-made ecosystems found in the areas are being surveyed and scientifically documented. Ecologically significant habitats such as sandy/rocky beaches, mangroves, estuaries and coral reefs have received our priority attention to understand their biological components and services. Investigations have also focussed on the species abundance and diversity of the fauna and flora found in these important habitats. For the offshore areas, information on the depth and bottom-types of the marine habitats has been generated together with their functions for spawning sites for both benthic and pelagic fisheries. Sightings of rare or endangered species such as dolphins and sea turtles are also documented. All the field data is being made available in the GIS format for use in the Integrated Coastal Zone Management. The GIS maps, video and photos will be invaluable to Sarawak Shell and Petronas Carigali in their attempt to accurately design an oil spill trajectory model. The trajectory model coupled with the environmental sensitivity index (ESI) for each kilometer of the coast will enable a prompt response to accidental oil spills and institute effective cleanup operations to minimise environmental damage and protect sensitive resources.

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UNIMAS E-JOURNAL ARBEC IS YAHOO-ED!

UNIMAS electronic journal, The ASEAN Review of Biodiversity and Environmental Conservation (ARBEC) has many reasons to celebrate upon making its debut into this new millennium. Through a grant awarded by the National IT Council (NITC) as a developer application pioneer, ARBEC developed content that can bring together through Internet access a community of people whose common interest converges on biodiversity and environmental conservation in the ASEAN countries. Since its modest appearance on the Internet in April 1997, ARBEC today has attracted quite a significant number of subscribers worldwide.

In March 2000, the most versatile and popular search engine Yahoo! has officially accepted ARBEC as one of their "What's New" site in its environmental-conservation category. Yahoo! is a customized database designed to serve the needs of the Internet community. The portal's search engine is powered by a well developed customized software to help users efficiently locate, identify and edit material stored on the Internet. Today, Yahoo! contains organized information on tens of thousands of computers linked to the Web. To be Yahoo-ed simply means that Unimas e-journal has now attained global recognition as one of the selected sites having content that is a cut above with respect to substance, relevancy and graphic appearance. Through Yahoo's worldwide outreach which stands at estimated 30 million hits a day, ARBEC's content can be delivered more efficiently and effectively to the relevant user groups. In this respect, ARBEC has also been selected by the National IT Council as one of the best practices to be demonstrated at the forthcoming Global Knowledge II Conference on March 7-10 2000 in Kuala Lumpur. As one of the best practice platform, ARBEC will be showcased to other developing countries on how IT can be effectively applied to develop an e-community dedicated to a specific area of interest; in this case issues on biodiversity and environmental conservation in the ASEAN region.

Recently ARBEC publisher MIMCED received a request by the world renowned Natural History Museum of London to enter into some form of collaborative venture to develop a series of digital publications on selected topics of biodiversity that will be articulated into a virtual museum. This smart partnership aims at pioneering an internet platform that will enable students of biodiversity to have access to digital images and scientific information of biological specimens collected over the past centuries from the ASEAN region but currently housed overseas. The journal's website www.arbec.com.my had received more than 12000 visitors to date. The global response to ARBEC came as a pleasant surprise and totally unexpected because its content was targeted at research scientists and professionals but not the masses. The journal had appointed EBSCO Online and Blackwell Science Navigator for global distribution.

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ANOTHER UNIMAS PUBLISHING VENTURE: AN ELECTRONIC JOURNAL ON INFORMATION SYSTEMS IN DEVELOPING COUNTRIES (EJISDC)

Researchers in developing countries regularly face the problem of gaining access to the published results of their co-researchers in other countries. Hard copy publishing is often a slow and expensive form of disseminating the results of research, with the consequence that the pace of growth and dissemination of important new knowledge is severely inhibited. Recognizing these problems in the field of Information Systems, the Faculty of Information Technology UNIMAS, in partnership with three other institutions, launched in January 2000 a new electronic journal, the Electronic Journal on Information Systems in Developing Countries (EJISDC), which is published on the Internet. EJISDC strives to become the foremost international forum for practitioners, teachers, researchers and policy-makers to share their knowledge and experience in the design, development, implementation, management and evaluation of information systems and technologies in developing countries. The journal acknowledges the particular problems and opportunities that emergent economies have to grapple with in order to achieve the best return on their technology investments within contexts that are usually markedly different from those from which the technology has emanated. We believe the time is right for this publishing venture, given the prominent role of information in development as well as the emergence of the Internet as the foremost means for its distribution. For more information please visit http://www.unimas.my/fit/roger/EJISDC/EJISDC.htm

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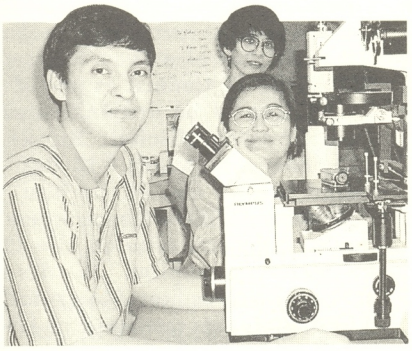
RESEARCH UPDATE

POSSIBLE CAUSE FOR 1997 KILLER OUTBREAK AMONG SARAWAK CHILDREN IDENTIFIED



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Today, the average Malaysian is beginning to realize, perhaps for the first time, that we cannot, even if we so desire, live in a world of isolation. With the rapidly increasing globalization of international travel, newly emerging infectious diseases constitute a major threat to health for the growing majority of the world's population who live in the tropical developing areas. The list of emerging and reemerging diseases now includes more than 35 in number that remain the leading causes of morbidity and mortality around the world. Indeed in Malaysia, increased public awareness on the threats posed by emerging and reemerging diseases has been spurred by several frightening episodes of disease emergence in the last few years. In the middle of 1997 in Sarawak, at least 37 children died of a mysterious outbreak characterised by heart failure and inflammation of the brain (encephalitis). The cause of the outbreak was initially attributed to enterovirus 71 which typically causes hand, foot and mouth disease. In the midst of the outbreak, researchers and medical practitioners began to doubt that an enterovirus was the primary agent for this mysterious outbreak. Two observations were pointed out during the outbreak. Firstly, the hand, foot and mouth disease is a regular occurrence and secondly, the disease is usually non-fatal. Cardosa and colleagues investigated 28 children admitted to Sibu Hospital, Sarawak, from April to September 1997. They obtained samples from 16 of the 20 children who died and from all eight who survived. Whereas enterovirus was isolated from three of the 16 fatal cases and none from the eight survivors, an unknown virus that was difficult to grow was detected in samples from 10 children who died and five survivors. Of these latter 15 viral isolates, ten were shown to be a type of adenovirus. The adenovirus is generally associated with upper respiratory symptoms in humans. Currebtly, there is evidence to show an aetiological link of Coxsackie B viruses as well as Subgenus C adenovirus with viral inflammatory heart diseases in children and adults. The poor growth of the adenovirus isolates made serotype identification of the causative agent through the conventional virus neutralisation assays almost impossible. However, through amplification of the VA RNA gene, a PCR product of approximately 500 bp was obtained. Further analysis of this product utilising restriction enzymes showed a genetic fingerprint distinctly different from previously described adenoviruses. This isolate, now designated as SIBU97, has been shown to be a subgenus B1 adenovirus.

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Reference:

Cardosa, MJ.,Krishnan, S., Tio, PH.,Perera, D. and SC Wong (1999) Isolation of a subgenus B adenovirus during fatal outbreak of enterovirus 71-associated hand, foot and mouth disease in Sibu, Sarawak. *The Lancet*, 354 : 987 - 991

IS B-LYMPHOCYTE MALIGNANCY LINKED TO CHROMOSOMAL ABNORMALITY?

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Chronic Lymphocytic Leukemia (CLL) is a clonal lymphoproliferative disorder involving the B-lymphocytes in 95 percent of the cases. In fact B-CLL is the most prevalent form of leukemia of the western world and accounts for 30 percent in the whole leukemias. It represents a malignancy of a subset of B-lymphocytes that coexpress CD5 and CD19 and/or CD20 antigens. Like normal B-lymphocytes, malignant B-lymphocytes express surface immunoglobulins. In cases of B-CLL, the usual marrow lymphocytosis is rarely demonstrable and thus the marrow criterion for diagnosis clonal lymphoproliferative disorder is frequently not met. In such instances, diagnosis hinges in demonstrating abnormal immonuphenotypic features which include expression of differentiation antigens CD5, CD19, CD20 and low density clonal surface immunoglobulins.

Trisomy is a situation in which three copies, instead of a normal pair, of one of the chromosomes exist. In humans, trisomy has received considerable attention since such chromosomal abnormality is always accompanied by phenotypic expression of one kind or another, more often detrimental than not. Trisomy 12 is one of the commonest cytogenetic abnormalities seen in B-cell lymphoproliferative disorders. It has been considered to be a feature of B-CLL , although it has been described in a variety of other conditions. In a number of recent series of B-cell chronic leukaemias, trisomy 12 has been found to be associated with both morphological and immunophenotypic features which are different from those seen in typical B-CLL. These features include larger-sized lymphocytes with a cleaved/ nucleolated nucleus with irregular margin and abundant cytoplasm. Lela Suut and her colleagues studied trisomy 12 in several cases of B-cell disorders that primarily involve the peripheral blood and bone marrow. The group found that the incidence of trisomy 12 in lymphoproliferative disorders was found to be 13.9%. This figure is lower than has been reported to be around 20%. Further, trisomy 12 has been shown to occur only in a specific group of B-cell lymphoproliferative disorders. It was not found in any cases of typical B-CLL as defined by morphology and immunophenotype. All of the cases in which trisomy 12 was found had atypical CLL morphology and in all but two cases there were >50% of cells with one or more morphological features which distinguished them from the cells seen in typical CLL. In almost all cases the majority of the tumour cells showed a range of atypical morphological features. The immunophenotype of the cases in which trisomy 12 was found was also highly characteristic. These results showed that it is possible using morphological and immunophenotypic criteria to define a specific subset of B-cell lymphoproliferative disorders which will include most, if not all, cases with trisomy 12 in the peripheral blood and bone marrow lymphoproliferative disorders. This study led to discussions on the possible role of trisomy 12 in the pathogenesis of B-cell lymphoproliferative disorders. Firstly, the atypical morphological and immunophenotypic features may be induced directly by the presence of trisomy 12, the acquisition of which causes progression from typical B-CLL or other forms of lymphoproliferative disorder. This possibility would imply that in cases without detectable trisomy12, there would be amplification of a subchromosomal segment of chromosome or some other mechanism of activation of critical genes responsible for induction of the phenotypic features. The second possibility is that there is a discrete entity, distinct from typical B-CLL or mantle cell lymphoma in which there is high probability of trisomy 12 developing. Cells containing trisomy 12 would result in the gradual emergence of a subclone containing the abnormality. It has already been suggested that trisomy-12-containing cells are more likely to be in cycle than those without the abnormality. It would be expected if this were the case there would be a gradual increase in the number of trisomy-12-containing cells with time. Much less is known about the factors which lead to the development of a specific chromosomal abnormality in a particular lymphoproliferative disorder.

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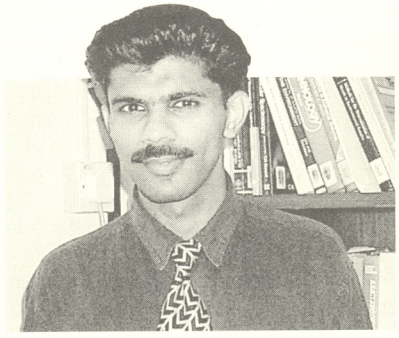
Reference:

Suut L, S J M O'Connor, S J Richards, R J Jones, B E Roberts, F E Davies, C D Fegan, A S Jack and G J Morgan (1998) Trisomy 12 is seen within a specific subtype of B-cell chronic lymphoproliferative disease affecting the peripheral blood/bone marrow and cosegregates with elevated expression of CD11a. *British Journal of Haematology* 101 : 165-170

RESEARCH UPDATE

NOVEL CLONING TOOL PAVES WAY FOR EFFICIENT GENE THERAPY



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Gene therapy is the treatment of diseases by replacing or rewriting bits of genetic code in a patient's cell. It holds monumental promises for both genetic and acquired diseases and is widely heralded as the next great champion of modern medicine. The challenge facing gene therapy is daunting and has yet to attain its true potential. The biggest hurdle is at the level of gene delivery where efficient and tissue-specific delivery of the curative bits of genetic code is of paramount importance. Currently the vector technology available to tackle the delivery problem is the highly efficient viruses that include the retroviruses and adenoviruses. The viral vectors however suffer from the limitation that only genes of sizes smaller than the flanking genes of the virion can be co-delivered. Recently the possibility of using the bacteria *Escherichia coli* for gene therapy has been explored. This is considered feasible because an *E. coli* based vector system will be able to deliver large genomic DNA-based transgenes with sufficient surrounding genomic sequences to include not only the gene of interest but also endogenous promoters and other regulatory elements.

Escherichia coli plays a central role in molecular biology by allowing the cloning, propagation and production of large amounts (up to hundreds of milligrams in fermentors) of highly pure foreign DNA. But cloning in bacterial host largely depends on the presence of convenient restriction endonuclease sites. This dependence leads to limitations on the average size that can easily be manipulated (about 20 kb) and on the position where the foreign DNA can be inserted. These limitations make the modification of large plasmid-based elements such as Bacterial Artificial Chromosomes (BACs) very difficult. Recently the "GET" recombination method was devised which relied on the expression of the two proteins Rec E and Rec T in the bacterial strains used. The GET recombination method only requires two segments of around 50 nucleotides of homology, flanking the DNA fragment to be cloned. A UNIMAS scientist Kumaran Narayanan and his colleagues at Royal Chlidrens Hospital, Australia, have successfully transferred and adapted the GET cloning strategy to the commonly used, commercially available strain of *E. coli*. They have efficiently and precisely introduced PCR fragments carrying a selectable marker and a reporter gene into a specific site within the ß -globin gene sequences in *E. coli* DH10B. Their report demonstrates that GET recombination method in bacteria is as efficient and flexible as homologous recombination performed in yeast artificial chromosomes (YACs). This cloning system (BACs) allows subtle modifications of very large fragment of DNA independent of restriction endonuclease sites while providing the advantages of a classical bacterial host.

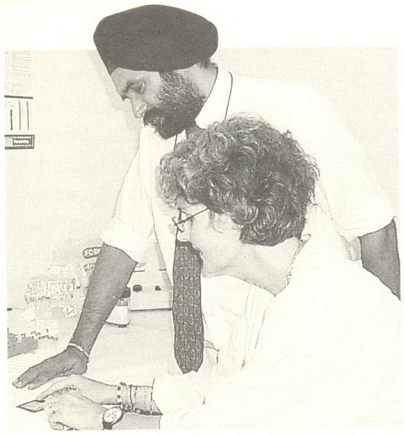
Gene therapy strategies usually involve the delivery of a cDNA driven by an heterologous promoter. The availability of a flexible cloning system such as GET recombination offers new opportunities to generate genomic-based DNA constructs containing the coding sequence of the affected gene as well as all the regulatory elements required for tissue-specific "physiological" levels of expression. GET recombination seems to be the ideal tool to engineer large, multicomponent DNA fragments, particularly at the optimisation stage. GET recombination method should help to generate better transgenes as well as allow the elaboration of more efficient and sophisticated strategies for gene therapy. These improvements are very likely to increase the size of the DNA fragments which need to be delivery vectors with large cloning capacities.

"This cloning system (BACs) allows subtle modifications of very large fragment of DNA independent of restriction endonuclease sites while providing the advantages of a classical bacterial host."

Reference:

Narayanan, K., R. Williamson, Y Zhang, AF Stewart and PA Ioannou (1999) Efficient and precise engineering of a 200kb ß-globin human/bacterial artificial chromosome in *E. coli* DH10B using an inducible homologous recombination system. *Gene Therapy* 6 : 442-447

BLOOD-SPOT SAMPLING AND NESTED PCR FOR BRUGIA MALAYI *DETECTION*



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The filariae are long, threadlike nematode parasites capable of inhabiting portions of the human lymphatic system and of the subcutaneous and deep connective tissues. The most important of the filarial diseases of humans are the lymphatic filariases caused by the occupation of the adult worms in the lymphatic system. Agents of lymphatic filariasis are *Wuchereria bancrofti, Brugia malayi* and *Brugia timori*. The World Health Organisation has targeted the year 2020 for eradication of lymphatic filariasis. Although 90% of the cases reported worldwide are caused by *Wuchereria bancrofti*, a further 10% are attributed to brugain filariasis, and are restricted to the Asian region. The detection of lymphatic filariasis has traditionally centred on clinical diagnosis and microscopy for circulating microfilaria. Whilst the membrane filtration method is more sensitive than Giemsa-stained thick blood films, high cost, cumbersome processing and reluctance of individuals to donate venous blood makes membrane-filtration unsuitable for large-scale field studies. Therefore, Giemsa-stained thick blood films are still widely use despite its low sensitivity and specificity.

For *Wuchereria bancrofti*, a method called ICT Filariasis test has been developed that enables detection of parasite-specific antigen in an individual, even in the absence circulating microfilaria in the patient's serum. In the case of *Brugia malayi*, however, an antigen suitable for detection in an ICT test format has yet to be identified, leaving sensitive PCR-based methods as the alternative to microscopy. PCR is more sensitive and specific than thick blood film and the membrane filtration methods for detecting *B. malayi* infection. However, blood collection and DNA extraction methods were not suitable for the field. Two researchers from UNIMAS, Janet Cox-Singh and Balbir Singh, together with their colleagues, have developed a PCR-based assay and successfully demonstrated its usefulness in detecting *B. malayi* in blood samples collected in an endemic region in Sabah, Malaysia. Formerly, the need for refrigerated storage and transportation of blood has limited the use of PCR for large-scale epidemiology studies in remote endemic areas. The new method involves simple finger-prick blood-spot collection, a one-tube DNA template extraction method and a *B. malayi*-specific nested PCR assay. A total of 145 field samples were screened and all 30 microscopy-positive samples yielded positive results in the PCR-based assay. Additionally 13 samples that were microscopy-negative gave positive results when tested using nested PCR assay. The increased sensitivity of this assay and simple blood collection method, may offer a valid alternative to microscopy for large-scale epidemiology studies in the effort to achieve the WHO target for global elimination of lymphatic filariasis by the year 2020.

"The increased sensitivity of this assay and simple blood collection method, may offer a valid alternative to microscopy for large-scale epidemiology studies in the effort to achieve the WHO target for global elimination of lymphatic filariasis by the year 2020."

Reference:
Janet Cox-Singh, Andrea S Pomrehn, Hassan A Rahman, Robaiza Zakaria, Andy O Miller and Balbir Singh (1999) Simple blood-spot sampling with nested polymerase chain reaction detection for epidemiology studies on *Brugia malayi*. *International Journal for Parasitology* 29: 717-721

RESEARCH UPDATE

REPRODUCTIVE BIOLOGY OF HAWKSBILL TURTLE POINTS TO EFFECTIVE CONSERVATION EFFORT AT PULAU GULISAAN, SABAH

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The hawksbill *Eretmochelys imbricata* is a circumtropically distributed marine turtle that inhabits and forages on coral reef areas and usually nests on isolated sandy beaches. For centuries the hawksbill has been harvested by man for its shell and meat, and its eggs have been collected to supplement human diets. It is currently listed as Endangered in the Red Data Book of the International Conservation Union (IUCN). Nesting in Sabah takes place primarily at the Turtle Islands Park (TIP) lying 40 km north of Sandakan and encompassing three islands. The highest nesting density is found on Pulau Gulisaan in the TIP ($x>400$ nests$\sum$year-1) accounting for 83.3% of total hawksbill nests within the Park. The remainder are shared by P. Selingan (10.8%) and P. Bakkungan (5.9%). At the TIP the beaches are also shared by green turtles, which account for 92.5% of total nesting, and very infrequently (unconfirmed) by the Olive Ridley *Lepidochelys olivacea*. Extensive surveys along the entire coastline of Sabah and many of the hundreds of small islands fringing the coast have revealed only diffuse evidence of hawksbill nesting. Today P. Gulisaan probably stands as the most important hawksbill rookery in the State, if not the region.

Although data sets exist for other world-wide nesting sites, there is no published information on the reproductive biology of the hawksbill turtle for Sabah, Malaysia. Information on egg production and harvests were presented over a decade ago, but was concerned more with the trade rather than the process. Since that time, the sale of eggs from Sabah's islands has become illegal and practically ceased, due mostly to the efforts of Sabah Parks personnel, who inhabit the islands and patrol the beaches nightly. The information on the few eggs that reach the market are scarce and guarded. The study done by Nicolas Pilcher of the Institute of Biodiversity and Environmental Conservation (IBEC) UNIMAS focused on the existing nesting records generated by Sabah Parks personnel since 1985 and also on primary data collected over the 1996 and 1997 seasons. Without the long term records maintained by the Park, the discovery and analysis of many trends in the nesting biology of this species would not have been possible. Further, the thoroughness and accuracy of the data set have enabled a critical evaluation of the changes and trends of the turtle's reproductive biology over the years. The records possibly are among the most important long-term data sets on hawksbill nesting in the world, along with those reported for Costa Rica and Australia.

Over 2180 new hawksbill females have been tagged on Gulisaan since 1985. Among the pertinent information that emerged from the study are average clutch size per nest, renesting occurrence, average individual nesting seasons, remigration interval, egg clutch sizes, average incubation period averaged, hatching success rates, average weights of eggs and hatchlings, nesting seasons and behaviour, predation and mortality rate of hatchlings. Since the establishment of the Turtle Islands Park and with gradual changes in legislature, the turtles nesting on the islands have become more and more protected. Today, P. Gulisan is one of the few remaining protected hawksbill nesting sites in the region, releasing over 15,000 hatchlings annually. While the fact that the nesting population has continued to visit the island may be heartening, its long-term fate remains to be seen. Low numbers of small eggs with a > 50 % loss in the nest alone and a high degree of mortality once the hatchlings leave the island's shores, along with a low remigration rates among adults, suggest that all may not be well with Sabah's hawksbills. Though nesting trends show a slight and promising rise in numbers of adults reaching the beaches, the cyclic nature of turtle nesting patterns precludes any conclusive argument in this respect.

"Low numbers of small eggs with a > 50 % loss in the nest alone and a high degree of mortality once the hatchlings leave the island's shores, along with a low remigration rates among adults, suggest that all may not be well with Sabah's hawksbills."

Reference:

Nicolas J Pilcher and Lamri Ali (1999) Reproductive biology of the Hawksbill turtle Eretmochelys imbricata in Sabah, Malaysia. *Chelonian Conservation and Biology* 3 : No 2 , 330-336

CAN DIFFERENCES IN ATTITUDES TOWARDS COMPUTERS BE ATTRIBUTED TO CULTURAL DIFFERENCES?

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"...it was surprising to discover that individuals from the poorer countries seemed to be more predisposed to use computers than those from the richer countries."

We know that peoples' behaviour will vary when they are confronted with the opportunity to use a computer and we know that such behaviour is influenced by their attitudes. If we examine the attitudes of similar people from varying cultural backgrounds, can we detect any variations in them which might be ascribed to those cultural differences? If it is possible to do so then we can construct a case that argues for the consideration of culture as something which might influence the adoption of computers. Most research on computer use comes from North America and Europe and it is often tempting to consider their view of reality as somehow being absolute. In developing countries, when we consider the use of information technology, it is too easy to accept foreign norms and subsequently wonder why they don't work in quite the way we expected. In an effort to understand the role of cultural background in differences in attitudes towards computers, Dr Roger Harris of the Faculty of Information Technology UNIMAS studied the attitudes of six groups of students of different cultural backgrounds towards computers. The groups were drawn from Tanzania, Thailand, Malaysia, Hong Kong, China and New Zealand (Maoris). Computer anxiety has been shown to be a potent influence on the attitudes that individuals hold toward computers. Personal involvement with a product such as computers is also known to be a significant predictor of attitudes towards that product. The groups varied considerably along both dimensions, but the largest variations seemed to be attributable to age and gender rather than to cultural differences. Older men seem to be less anxious about computers and more involved with them than do women. Differences between the attitudes of the other groups could not be so easily explained by age and gender and it is possible that they are attributable to cultural differences. Experience with computers seems to alleviate computer anxiety for all cultural groups. Finally, it was surprising to discover that individuals from the poorer countries seemed to be more predisposed to use computers than those from the richer countries. This finding was unexpected and it needs to be further researched in order to assess the implications for developing countries' use of information technology.

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WHAT MOTIVATES BIDAYUH WOMEN OF SARAWAK TO MIGRATE TO THE CITY?

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Migration has often been discussed in an economically deterministic way in terms of the push and pull factors. Although larger structural forces have a profound effect on people's behaviour, not enough attention is paid to the choices and decisions that people make, and the actions that they take. People do not just react, they also act. They also do not act purely out of pragmatic rationality such as to further economic interests *albeit* it often represents an aspect of their motivation. People are driven to act because of a host of other reasons. A study of Bidayuh women's experiences of waged work and the interpenetration of employment and the household was undertaken by a UNIMAS social scientist Hew Cheng Sim. The group of Bidayuh women interviewed were first generation urban wage earners in their households, whose mothers were farmers in the village.

The majority of the women studued did not migrate merely to escape rural poverty but did so because of a larger transformative project of becoming modern. In other words, their migration is not just about 'getting', it is also about 'becoming'. The study also found that the motivations for migration were gendered, as men and women gave different reasons for migration. In addition, women at different phases of their life-course had different experiences and different strategies in coping with economic change and opportunity. The financial independence and the new-found freedom experienced by single women were often short-lived and curtailed when they marry and have their own children. Some working mothers and housewives return to stay in the village to reduce the cost of living while yearning for city life, while others stayed in the city and made plans to retire in the village.

Some theorists have suggested that the urban capitalist sector feeds off the rural subsistence economy which supplies the labour power and bears the cost of reproducing labour power. Thus, capital can pay low wages. In turn, low wages mean that migrants will not transfer their social and family cost to the towns and in this way the urban capitalist sector is parasitic on the food and goods produced in the agrarian village economy. However, the findings of this study appear to indicate greater interdependence between the rural and urban and less disjuncture between the two sectors. Common exchanges were domestic labour for city daughters during childbirths and sicknesses, child-care by kin in the village and village commodities like fruits, vegetables and rice were given to city daughters. Conversely, the remittance of city daughters play a pivotal role in the agrarian economy. Remittances from off-farm workers in the household help to cushion any crisis which is triggered by falling prices of cash crops. They also enable farmers to optimise their various agricultural activities. In addittion, urban daughters return to help their mothers in farming when extra labour is required. In the absence of institutional state welfare provisions, there are important links of support and co-operation between village and city households in order to ensure the survival of both. The city and its hinterland therefore cannot be represented as structurally discontinuous. On the contrary, the vacillation between rural and urban is a reflection of a complex web of rural-urban networks.

"The majority of the women studued did not migrate merely to escape rural poverty but did so because of a larger transformative project of becoming modern."

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CARING FOR THE PSYCHIATRIC PATIENTS IN THE COMMUNITY: AN EVALUATION OF SERVICES

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Modern service delivery has moved from an institutional care model to one based on 'care in the community' principles. A study by two UNIMAS researchers, Sara Crabtree and Gabriel Chong, sought to evaluate the largely unexplored perceptions of service users towards psychiatric outreach work in relation to community needs and against a backdrop of rich ethnic diversity. Hospital Sentosa, a small psychiatric hospital on the outskirts of Kuching was chosen for the study. Commensurate with the above trend, the hospital established a community psychiatric nursing team (CPN) in 1992 with help from the VSO services to combat problems of outpatient attendance and medication defaulting. In common with other Asian countries, the majority of service users receiving psychiatric services in Sarawak live at home. The majority of those receiving CPN services have been diagnosed as schizophrenics, of whom many are chronic sufferers.

The study explored the perceptions of the nature and aetiology of mental illness as understood in the cultural context and perceptions of psychiatric services. Findings established that many carers had struggled with the needs of sick relatives for years prior to receiving help from the psychiatric services. Predominantly the burden of care fell on a single carer who was invariably female, thus reinforcing traditional gender roles. This said, in subsidence Dayak families it was not uncommon to find that mentally ill people were expected to contribute their labour. Role change rather than role deprivation was often a feature therefore of economically interdependent family units, probably affirming the worth of the individual within the family even in times of illness. Yet altogether many families were deeply concerned about the future of their sick relative and for these people Hospital Sentosa was seen to be the ultimate destination.

The majority of carers did not think in terms of 'mental illness' but ascribed their relative's conditions to other causes within a culturally defined schema. Approximately one third attributing illness to bewitchment of various sorts. Few families sought conventional biomedical treatment in the first place but had visited diverse traditional practitioners, sometimes across ethnic/religious divides. The majority of carers expressed satisfaction in the CPN services. For many a combination of rugged terrain, poor public transport and expense prevented regular outpatient attendance. Although the CPN team were involved in the psychoeducation of families into the causes of mental illness, most however maintained the same beliefs as prior to intervention. Furthermore findings show that many carers desperately needed respite care and that the unremitting burden of care was liable to lead to unsuitable methods of management in the home which were often inappropriate, occasionally harmful and unethical. In some cases lack of sufficient respite resulted in complete rejection of service users.

Many duties undertaken by the CPNs are more suited to the skills and training of psychiatric social workers who are specifically equipped in family intervention strategies and are capable of developing appropriate and separate support groups for service users and families. Finally, the culture of biomedicine stands in uneasy relationship with the culture of traditional healers, where the latter is seen to be an anachronistic and inappropriate form of care. Nonetheless based on findings, traditional healing was often seen to be helpful, tended to exculpate suffers and acted as form of community cohesion. The loss of connection with tradition and culturally normative perspectives needs further study before it can be confidently assumed that such a loss is in the service users' best interests.

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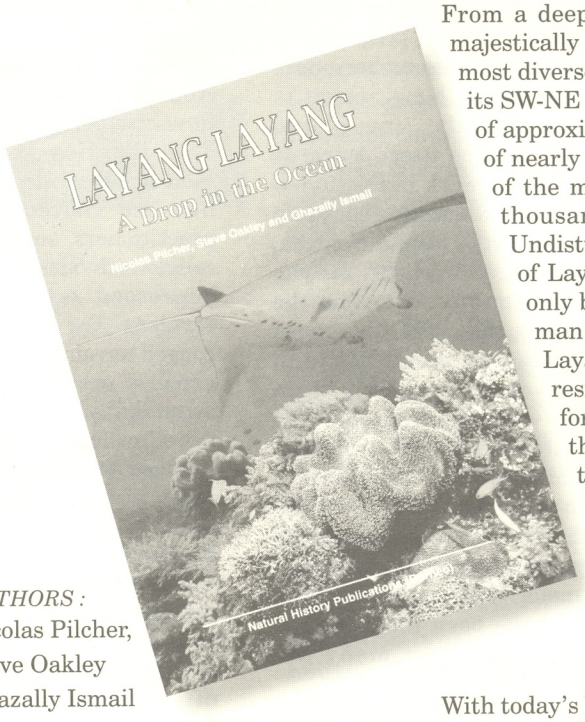
NEW BOOKS BY UNIMAS STAFF

LAYANG LAYANG: A DROP IN THE OCEAN



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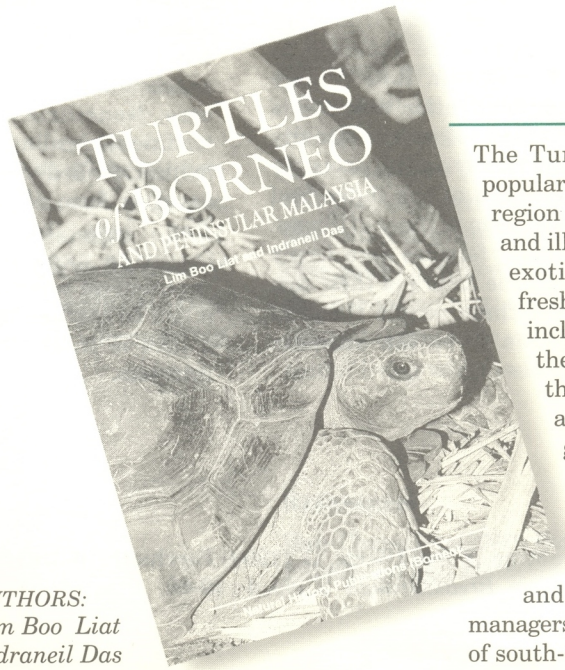
From a deep trench in the South China Sea, Layang Layang rises majestically to trap the sea's bounty and provide shelter to some of the most diverse coral reefs in the world. Extending nearly seven km along its SW-NE axis and nearly two km wide, the reef alone covers an area of approximately 4.1 square kilometers with a outside circumference of nearly 17 kilometers. It is along the outside of this reef that some of the most exceptional marine habitats may be found, home to thousands of species of fish, corals and other invertebrates. Undisturbed by land-based pollution and erosion runoff, the reefs of Layang Layang have flourished and developed into what can only be classified as pristine marine ecosystems, unblemished by man's activities. The island derives its name from the Malay Layang Layang, which means Swallows. These birds have been resident in large numbers on the island since its creation, and form the backbone of an ever-increasing population of avifauna that resides on the island. In the months of July to October this population swells to accommodate an influx of more than 10,000 other wintering birds from northern climates and nesters such as the Sooty, Great Crested and Black-Naped Terns, Brown Boobies and Noddys. The island serves as a sanctuary for the birds on their annual migrations, along with the other sand cays, islands and rocky outcrops of the Spratley region.

With today's heightened awareness of the fragility in marine ecosystems, Layang Layang: A Drop in the Ocean serves to enlighten the reader about the actual processes that keep alive one of the planet's most majestic habitats; the coral reefs. Drawing on examples at one of the world's most pristine and highly acclaimed atolls, the lessons contained in this book are nevertheless applicable to reefs worldwide, and in particular throughout the Southeast Asian region. The book explores many of the unanswered questions by divers as they explore the marine rainforest equivalents. From symbiotic relationships to rare sightings, from feeding strategies to ecological behaviour, the words and pictures clarify and explain the wonderfully complex coral reef ecosystem in a clear and understandable manner. Coral reefs are home to much of the globe's marine biodiversity. This diversity exists across different families, different species, and even down to the genetic differences among individuals. Our understanding of the processes occurring in the oceans are in a juvenile stage as compared to our knowledge of what happens on land. It is the hope of the authors that this volume will enlighten the public on the plight of these fragile marine ecosystems, and to share our love for the underwater realm.

TURTLES OF BORNEO AND PENINSULAR MALAYSIA



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Lim Boo Liat
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The Turtles of Borneo, Peninsular Malaysia and Singapore is a popular account of the turtles, tortoises and terrapins of a tropical region known for its rich biodiversity. In all, 25 species are described and illustrated with one or more colour photographs, including two exotics that are now established. All marine, terrestrial and freshwater species have been covered. The introductory chapters include introduction to these reptiles and an identification key to the turtles of the region. For each species, a description allowing the identification of males, females and juveniles, is provided, in addition to the meaning of the current scientific name, its global and local distribution, notes on natural history (including behaviour, habitats used, diet and reproduction), and conservation status. A glossary of technical terms is appended at the back, in order to make the work accessible to the layperson. The Turtles of Borneo, Peninsular Malaysia and Singapore will be of interest, to tourists, biologists, park managers, conservationists, and those curious about the wilderness areas of south-east Asia.